Resource, Reliability and Environmental Concerns of Aging Power Plant Operations and Retirements

California Energy Commission

APPENDIX F
Characteristics of Cooling Water Systems Of Aging Powerplants

Note: This file also available to download as Microsoft Excel file. Please see website.

Appendix F: Characteristics of Cooling Water Systems of Aging Power Plants

	Unit Identification			ER 94 ESPAR[1]			Cooling Water Flow Data						Thermal Plume		
	EIA Plant ID	Plant	Unit	In-Service Year	Dependable Capacity (MW)	Once Through Cooled	Permitted (MGD)	Actual Last 2years (MGD)	NPDES Permit Expiration	Date of Most Recent 316(a) Study	Most Recent 316(b)	Most Recent 316(b) Study Results	Variances?	Area	Effects
1	228	Contra Costa	6	1964	340	YES	341 for 6&7		April 1,2006	1992	1978-1979	inadequate	yes	5-45 acres	contacts up to 500 ft of shore
2	228	Contra Costa	7	1964	340	YES	341 for 6&7		April 1,2006	1992	1978-1979	inadequate	yes	5-45 acres	contacts up to 500 ft of shore
3	246	Humboldt Bay	1	1956	52	YES	78.3 for 1&2	76 for 1&2	April 26,2006	1982	1979-80	inadequate	no	50 hectares	^T of 4 F extend 50 to 150 ft no and so of discharge
4	246	Humboldt Bay	2	1958	53	YES	78.3 for 1&2	76 for 1&2	April 26,2006	1982	1979-80	inadequate	no	50 hectares	^T of 4 F extend 50 to 150 ft no and so of discharge
5	247	Hunters Point	4	1958	163	YES	412	105	May 18,2004	1991	1978-79	inadequate	no	50 acres	may be extensive areas of plume contact with bottom
6	259	Morro Bay Power Plant	1	1956	163	YES	265 for 1&2		Mar 10,2000	2001	2001	significant losses of larvae of estuarine fishes and cancer cabs	yes	contacts shoreline near Morro Rock for a length of 2000 to 5000 ft	impacts to rocky intertidal community
7	259	Morro Bay Power Plant	2	1955	163	YES	265 for 1&2		Mar 10,2000	2001	2001	significant losses of larvae of estuarine fishes and cancer cabs	yes	contacts shoreline near Morro Rock for a length of 2000 to 5000 ft	impacts to rocky intertidal community
8	259	Morro Bay Power Plant	3	1962	338	YES	403 for 3&4		Mar 10,2000	2001	2001	significant losses of larvae of estuarine fishes and cancer cabs	yes	contacts shoreline near Morro Rock for a length of 2000 to 5000 ft	impacts to rocky intertidal community
9	259	Morro Bay Power Plant	4	1963	338	YES	403 for 3&4		Mar 10,2000	2001	2001	significant losses of larvae of estuarine fishes and cancer cabs	yes	contacts shoreline near Morro Rock for a length of 2000 to 5000 ft	impacts to rocky intertidal community
10	260	Moss Landing Power Plant	6	1967	739	YES	864 for 6&7	750 for 6&7	Oct 27,2005	2000	2000	entrainment would kill 13 percent of larval organisms in source water	yes	72 acres	plume contacts rocky and sandy intertidal and benthic subtidal
11	260	Moss Landing Power Plant	7	1968	739	YES	864 for 6&7	750 for 6&7	Oct 27,2005	2000	2000	entrainment would kill 13 percent of larval organisms in source water	yes	72 acres	plume contacts rocky and sandy intertidal and benthic subtidal
12	271	Pittsburg Power	5	1960	325	YES	1070 for 1-6	658 for 1-6	May 31,2007	1992	1993	for striped bass only	yes	8-91 acres	plume contacts over 100 ft of shoreline and bottom to 5oo ft offshore
13	271	Pittsburg Power	6	1961	325	YES	1070 for 1-6	658 for 1-6	May 31,2007	1992	1993	for striped bass only	yes	8-91 acres	plume contacts over 100 ft of shoreline and bottom to 5oo ft offshore
14	271	Pittsburg Power	7	1972	720	cooling towers									
15	273	Potrero Power	3	1965	207	YES	226		May 18,2004	1991	2001	complete study results unavailable	yes	10-150 acres	reduction in intertidal diversity, probable effects on herring eggs
16	302	Encina	1	1954	107	YES	863 for 1-5	580	Feb 9,2005	1997	1980	inadequate	yes	1.2 miles longx0.6 miles offsshore	plume contacts 1.2 miles of beach, rocky intertidal and kelp bed
17	302	Encina	2	1956	104	YES	863 for 1-5	580	Feb 9,2005	1997	1980	inadequate	yes	1.2 miles longx0.6 miles offsshore	plume contacts 1.2 miles of beach, rocky intertidal and kelp bed
18	302	Encina	3	1958	110	YES	863 for 1-5	580	Feb 9,2005	1997	1980	inadequate	yes	1.2 miles longx0.6 miles offsshore	plume contacts 1.2 miles of beach, rocky intertidal and kelp bed
19	302	Encina	4	1973	293	YES	863 for 1-5	580	Feb 9,2005	1997	1980	inadequate	yes	1.2 miles longx0.6 miles offsshore	plume contacts 1.2 miles of beach, rocky intertidal and kelp bed
20	302	Encina	5	1978	315	YES	863 for 1-5	580	Feb 9,2005	1997	1980	inadequate	yes	1.2 miles longx0.6 miles offsshore	plume contacts 1.2 miles of beach, rocky intertidal and kelp bed
21	310	South Bay Power Plant	1	1960	147	YES	601.2 for 1-4		Nov 14,2001	2003	2003	results not yet available		most of south San Diego Bay	probable effects on marsh and eelgrass, results not yet available
22	310	South Bay Power Plant	2	1962	150	YES	601.2 for 1-4		Nov 14,2001	2003	2003	results not yet available		most of south San Diego Bay	probable effects on marsh and eelgrass, results not yet available
23	310	South Bay Power Plant	3	1964	171	YES	601.2 for 1-4		Nov 14,2001	2003	2003	results not yet available		most of south San Diego Bay	probable effects on marsh and eelgrass, results not yet available
24	310	South Bay Power Plant	4	1971	222	YES	601.2 for 1-4		Nov 14,2001	2003	2003	results not yet available		most of south San Diego Bay	probable effects on marsh and eelgrass, results not yet available
25	315	AES Alamitos LLC	1	1956	175	YES	208 for 1&2		May 10,2005	1971-72	1981	inadequate		440-1650 acres	plume contacts shore for about 8000 ft each north and south of river mouth
26	315	AES Alamitos LLC	2	1957	175	YES	208 for 1&2		May 10,2005	1971-72	1981	inadequate		440-1650 acres	plume contacts shore for about 8000 ft each north and south of river mouth
27	315	AES Alamitos LLC	3	1961	320	YES	389 for 3&4		May 10,2005	1971-72	1981	inadequate		440-1650 acres	plume contacts shore for about 8000 ft each north and south of river mouth
28	315	AES Alamitos LLC	4	1962	320	YES	389 for 3&4		May 10,2005	1971-72	1981	inadequate		440-1650 acres	plume contacts shore for about 8000 ft each north and south of river mouth
29	315	AES Alamitos LLC	5	1969	480	YES	674 for 5&6		May 10,2005	1971-72	1981	inadequate		440-1650 acres	plume contacts shore for about 8000 ft each north and south of river mouth
30	315	AES Alamitos LLC	6	1966	480	YES	674 for 5&6		May 10,2005	1971-72	1981	inadequate			
31	329	Coolwater	1	1961	65	NO									
32	329	Coolwater	2	1964	81	NO									
33	329	Coolwater	3	1978	241	NO									
34	329	Coolwater	4	1978	241	NO									
35	330	El Segundo Power	3	1964	335	YES	398 for 3&4	317	May 10,2005	1975	1982	inadequate	no	modeled at about 800 acres of 4 degree F elevation for all units	modeled for all unit sto touch beach for a length of 2000 to 3000 ft.
36	330	El Segundo Power	4	1965	335	YES	398 for 3&4	317	May 10,2005	1975	1982	inadequate	no	modeled at about 800 acres of 4 degree F elevation for all units	modeled for all unit sto touch beach for a length of 2000 to 3000 ft.
37	331	Etiwanda Generating Station	3	1963	320	NO									
38	331	Etiwanda Generating Station	4	1963	320	NO									
39	335	AES Huntington Beach LLC	1	1958	215	YES	516 for 1,2&5	256 for 1&2	Jun 1,2005	1971-72	in progress	not yet available	no	62 acres	plume extends a maximum of 4000 ft
40	335	AES Huntington Beach LLC	2	1958	215	YES	516 for 1,2&5	256 for 1&2	Jun 1,2005	1971-72	in progress	not yet available	no	62 acres	plume extends a maximum of 4000 ft
41	341	Long Beach Generation LLC	8	1976	303	YES	265 for 8&9	67	Nov 10,1999	1974-78	1981	inadequate	no	400 ft up channel, 280 ft down	none detected
42	341	Long Beach Generation LLC	9	1977	227	YES	265 for 8&9	67	Nov 10,1999	1974-78	1981	inadequate	no	400 ft up channel, 280 ft down	none detected
43	345	Mandalay	1	1959	215	YES	255 for1&2	230	Mar 10,2006	1973	1981	inadequate	no	150 acres	elevated temperatures in littoral zone
44	345	Mandalay	2	1959	215	YES	255 for1&2	230	Mar 10,2006	1973	1981	inadequate	no	150 acres	elevated temperatures in littoral zone
45	350	Ormond Beach	1	1971	750	YES	688 for 1&2	562	May 10,2006	1974	1979-80	inadequate	no	72 acres	minimal
46	350	Ormond Beach	2	1973	750	YES	688 for 1&2	562	May 10,2006	1974	1979-80	inadequate	no	72 acres	minimal
47	356	AES Redondo Beach LLC	5	1954	175	YES	215 for 5&6		May 10,2005	1971-73	1979-80	inadequate	no	much of King Harbor and 100s of ft upcoast, downcoast and offshore	impacts to soft benthos, fish populations and subtidal algae
48	356	AES Redondo Beach LLC	6	1957	175	YES	215 for 5&6		May 10,2005	1971-73	1979-80	inadequate		much of King Harbor and 100s of ft upcoast, downcoast and offshore	impacts to soft benthos, fish populations and subtidal algae
49	356	AES Redondo Beach LLC	7	1967	480	YES	674 for 7&8		May 10,2005	1971-73	1979-80	inadequate		much of King Harbor and 100s of ft upcoast, downcoast and offshore	impacts to soft benthos, fish populations and subtidal algae
50	356	AES Redondo Beach LLC	8	1967	480	YES	674 for 7&8		May 10,2005	1971-73	1979-80	inadequate		much of King Harbor and 100s of ft upcoast, downcoast and offshore	impacts to soft benthos, fish populations and subtidal algae
51	377	Grayson	1	1977	20	NO									
52	377	Grayson	2	1977	20	NO									
53	377	Grayson	3	1953	19	NO									
54	377	Grayson	4	1959	44	NO									
55	377	Grayson	5	1969	42	NO									
56	377	Grayson	8	1977	95	NO									
57	389	El Centro	2	1952	35	NO									
58	389	El Centro	3	1952	44	NO									
59	389	El Centro	4	1968	74	NO									
60	400	Haynes	1	1962	222	YES	208 for 1&2		May 10,2005	1971-72	1978-79	inadequate		440-1650 acres	plume contacts shore for about 8000 ft each north and south of river mouth
61	400	Haynes	2	1963	222	YES	208 for 1&2		May 10,2005	1971-72	1978-79	inadequate		440-1650 acres	plume contacts shore for about 8000 ft each north and south of river mouth
62	400	Haynes	5	1967	341	YES	674 for 5&6		May 10,2005	1971-72	1978-79	inadequate		440-1650 acres	plume contacts shore for about 8000 ft each north and south of river mouth
63	400	Haynes	6	1967	341	YES	674 for 5&6		May 10,2005	1971-72	1978-79	inadequate		440-1650 acres	plume contacts shore for about 8000 ft each north and south of river mouth
64	404	Scattergood	1	1958	179	YES	496 for 1,2,3		May 10,2005	1973	1981	inadequate			
65	404	Scattergood	2	1959	179	YES	496 for 1,2,3		May 10,2005	1973	1981	inadequate			
66	404	Scattergood	3	1974	445	YES	496 for 1,2,3		May 10,2005	1973	1981	inadequate			
67	420	Broadway	B3	1965	66	NO									
68	6013	Olive	1	1959	46	NO									
69	6013	Olive	2	1964	55	NO									
		Selected			**3,678**										
		Total			**17,201**		**1,000**	**5,000**							
				#REF!	*#REF!*		*#REF!*	*#REF!*		*#REF!*		*#REF!*			
				#REF!								*#REF!*			

	Intake Design						Outfall		
Biofouling Control	**Location**	**Screen Type**	**Mesh Size**	**Velocity**	**BTA**	**Location**	**Discharges in Addition to Cooling Water**	**Sensitive Aquatic Species in Area**	**County**
chlorine	shoreline	vertical traveling	3/8 in	0.8 fps	VSD, fish escape routes	500 ft long discharge channel	washwater, process water, storm runoff	Delta smelt, Sacramentosplittail, Chinook salmon, steelhead	Contra Costa
chlorine	shoreline	vertical traveling	3/8 in	0.8 fps	closed-cycle,VSD, fish escape routes	500 ft long discharge channel	washwater, process water, storm runoff	Delta smelt, Sacramentosplittail, Chinook salmon, steelhead	Contra Costa
heat	through pipes that draw water from Long Beach Marina	traveling	3/8 in	1.3 fps		360 ft canal and 4 pipes into Bay	oil/water separators, metal cleaning waste,boiler wash, radioactive waste,blowdown, storm runoff		Humboldt
heat	1200 ft long canal from Bay	traveling	3/8 in	1.3 fps		360 ft canal and 4 pipes into Bay	oil/water separators, metal cleaning waste,boiler wash, radioactive waste,blowdown, storm runoff		Humboldt
chlorine,heat, manual	intake pipe to forebay	mesh panels	3/8 in	0.1-3 fps		2 shoreline structures in India Basin	lube water, demusseling waste, intake screen wash, storm runoff	Chinook salmon, steelhead	San Francisco
heat	inside Morro Bay	traveling	3/8 in.		traveling screens	canal into intertidal of Estero Bay		steelhead, sea otter, tidewater goby	San Luis Obispo
heat	inside Morro Bay	traveling	3/8 in.		traveling screens	canal into intertidal of Estero Bay		steelhead, sea otter, tidewater goby	San Luis Obispo
heat	inside Morro Bay	traveling	3/8 in.		traveling screens	canal into intertidal of Estero Bay		steelhead, sea otter, tidewater goby	San Luis Obispo
heat	inside Morro Bay	traveling	3/8 in.		traveling screens	canal into intertidal of Estero Bay		steelhead, sea otter, tidewater goby	San Luis Obispo
het	Moss Landing harbor	traveling	3/8 in	0.8 fps	traveling screens	Monterey Bay - 600 ft offshore		steelhead, sea otter, tidewater goby	Monterey
heat	Moss Landing Harbor	traveling	3/8 in	0.8 fps	traveling screens	Monterey Bay - 600 ft offshore		steelhead, sea otter, tidewater goby	Monterey
	south shore of Suisun Bay			0.8 fps	VSD, fish escape routes	Suisun Bay at 20-25 ft depth	screen wash, blowdown, metal cleaning	Delta smelt, Sacramentosplittail, Chinook salmon, steelhead	Contra Costa
	south shore of Suisun Bay			0.8 fps	VSD, fish escape routes	Suisun Bay at 20-25 ft depth	screen wash, blowdown, metal cleaning	Delta smelt, Sacramentosplittail, Chinook salmon, steelhead	Contra Costa
					closed-cycle system	canal			Contra Costa
heat	shoreline structure in San Francisco Bay	slide screen	3/8 in			San Francisco Bay shoreline	process water, stormwater runoff	Chinook salmon, steelhead	San Francisco
heat	inlet channel in Aqua Hedionda Lagoon	traveling	3/8 in		traveling screens	channel across beach and into surf	low volume wastes, metal cleaning wastes, storm runoff	tidewater goby	San Diego
heat	inlet channel in Aqua Hedionda Lagoon	traveling	3/8 in		traveling screens	channel across beach and into surf	low volume wastes, metal cleaning wastes, storm runoff	tidewater goby	San Diego
heat	inlet channel in Aqua Hedionda Lagoon	traveling	3/8 in		traveling screens	channel across beach and into surf	low volume wastes, metal cleaning wastes, storm runoff	tidewater goby	San Diego
heat	inlet channel in Aqua Hedionda Lagoon	traveling	3/8 in		traveling screens	channel across beach and into surf	low volume wastes, metal cleaning wastes, storm runoff	tidewater goby	San Diego
heat	inlet channel in Aqua Hedionda Lagoon	traveling	5/8 in		traveling screens	channel across beach and into surf	low volume wastes, metal cleaning wastes, storm runoff	tidewater goby	San Diego
chlorine	dredged intake channel in San diego Bay	traveling			traveling screens	via cooling channel into San Diego Bay	low volume wastes, metal cleaning wastes, storm runoff		San Diego
chlorine	dredged intake channel in San diego Bay	traveing			traveling screens	via cooling channel into San Diego Bay	low volume wastes, metal cleaning wastes, storm runoff		San Diego
chlorine	dredged intake channel in San diego Bay	traveling			traveling screens	via cooling channel into San Diego Bay	low volume wastes, metal cleaning wastes, storm runoff		San Diego
chlorine	dredged intake channel in San diego Bay	traveling			traveling screens	via cooling channel into San Diego Bay	low volume wastes, metal cleaning wastes, storm runoff		San Diego
heat, chlorine	via two short intake canals from the Cerritos Channel	traveling	1 in		traveling screens	via sluiceways to San Gabriel River			Los Angeles
heat, chlorine	via two short intake canals from the Cerritos Channel	traveling	1 in		traveling screens	via sluiceways to San Gabriel River			Los Angeles
heat, chlorine	via two short intake canals from the Cerritos Channel	traveling	1 in		traveling screens	via sluiceways to San Gabriel River			Los Angeles
heat, chlorine	via two short intake canals from the Cerritos Channel	traveling	1 in		traveling screens	via sluiceways to San Gabriel River			Los Angeles
heat, chlorine	via two short intake canals from the Cerritos Channel	traveling	1 in		traveling screens	via sluiceways to San Gabriel River			Los Angeles
									Los Angeles
									San Bernardino
									San Bernardino
									San Bernardino
									San Bernardino
heat, chlorine	open pipe in Santa Monica Bay	at forebay	1 in	4.1 fps	velocity cap	offshore in Santa Monica Bay			Los Angeles
heat, chlorine	open pipe in Santa Monica Bay	at forebay	1 in	4.1 fps	velocity cap	offshore in Santa Monica Bay			Los Angeles
									San Bernardino
									San Bernardino
heat, chlorine	open pipe offshore Huntington Beach	at forebay	1 in		velocity cap	offshore Huntington Beach	boiler blowdown, low volume waste, air pre-heter wash, boiler wsh, cleaning wastes, stormwater		Orange
heat. chlorine	open pipe offshore Huntington Beach	at forebay	1 in		velocity cap	offshore Huntington Beach	boiler blowdown, low volume waste, air pre-heter wash, boiler wsh, cleaning wastes, stormwater		Orange
heat, chlorine	back channel of Long Beach harbor	trveling	1 in	0.4-1.3 fps	traveling screen	bank outfall at Berth 114	boiler blowdown, groundwater, laboratory drains		Los Angeles
heat, chlorine	back channel of Long Beach harbor	traveling	1 in	0.4-1.3 fps	traveling screen	bank outfall at Berth 114	boiler blowdown, groundwater, laboratory drains		Los Angeles
chlorine	shoreline of Edison Canal					rock canal onto sandy beach	metal cleaning wastes, low volume wastes		Ventura
chlorine	shoreline of Edison Canal					rock canal onto sandy beach	metal cleaning wastes, low volume wastes		Ventura
heat, chlorine	open pipe 2000 ft offshore	at forebay	1 inch	2.7 fps	velocity cap	1800 ft offshore	metal cleaning wastes, low volume wastes		Ventura
heat, chlorine	open pipe 2000 ft offshore	at forebay	1 in	2.7 fps	velocity cap	1800 ft offshore	metal cleaning wastes, low volume wastes		Ventura
heat, chlorine	opem pipe offshore Santa Monica Bay						groundwater seepage, low volume wastes		Los Angeles
heat, chlorine	opem pipe offshore Santa Monica Bay						groundwater seepage, low volume wastes		Los Angeles
heat, chlorine	opem pipe offshore Santa Monica Bay			2.7 fps			condensate overflow, tank farm run-off, yard drains		Los Angeles
heat, chlorine	opem pipe offshore Santa Monica Bay			2.7 fps			condensate overflow, tank farm run-off, yard drains		Los Angeles
									Los Angeles
									Los Angeles
									Los Angeles
									Los Angeles
									Los Angeles
									Los Angeles
									Imperial
									Imperial
									Imperial
heat	through pipes that draw water from Long Beach Marina					bank of San Gabriel River			Los Angeles
heat	through pipes that draw water from Long Beach Marina					bank of San Gabriel River			Los Angeles
heat	through pipes that draw water from Long Beach Marina					bank of San Gabriel River			Los Angeles
heat	through pipes that draw water from Long Beach Marina					bank of San Gabriel River			Los Angeles
heat,chlorine	open pipe offshore Santa Monica Bay	at forebay		1.5 fps	velocity cap	offshore Santa Monica Bay	pretreated metal cleaning wastes, low volume wastes		Los Angeles
heat, chlorine	open pipe offshore Santa Monica Bay	at forebay		1.5 fps	velocity cap	offshore Santa Monica Bay	pretreated metal cleaning wastes, low volume wastes		Los Angeles
heat, chlorine	open pipe offshore Santa Monica Bay	at forebay		1.5 fps	velocity cap	offshore Santa Monica Bay	pretreated metal cleaning wastes, low volume wastes		Los Angeles
									Los Angeles
									Los Angeles
									Los Angeles
22									
69									